Prospects for inclusive mobile learning

Book Section

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ABSTRACT

Mobile learning promises more equitable access to education, especially to those who have suffered exclusion for social or economic reasons. Yet concerns have been raised that mobile technologies also introduce certain problems and barriers. Furthermore, unforeseen technological developments in the mobile marketplace undermine the fragile stability of mobile learning, while it struggles to assert itself as an acceptable innovation within education. This paper examines the concept of inclusive mobile learning for the new generation of mobile learning tools and strategies. It includes a review of some mobile learning projects that are furthering the inclusion agenda and bringing hope to learners who have particular needs. Finally, the paper offers a critical perspective on emerging forms of mobile interaction.

KEYWORDS

Inclusive pedagogy; accessible mobile learning; social inclusion; digital inclusion; learning differences; visual impairmen

INTRODUCTION

The broad repertoire of research in mobile learning over the past decade has included a valuable strand of activity concerned with social and digital inclusion. The EU-funded 'm-learning' research and development project [2], one of the earliest substantial projects in this area, deployed mobile devices to help young adults who were disaffected learners and had not succeeded in the education system. The project inspired many researchers

and education practitioners to focus their efforts on certain target populations that could benefit significantly from the integration of mobile devices into educational activities that would previously have been carried out by more traditional means. Alongside this work, much has been achieved in terms of defining the needs of learners with disabilities and specific learning difficulties, and determining how mobile learning can be made more accessible for all. Rainger's work on mobile accessibility [18] produced one of the first overviews of relevant issues, dealing with technical concerns, the user interface, and the various device and software features that may hinder accessibility or improve it.

The mobile learning literature tends to report successful experiments in an effort to demonstrate the value of mobile learning and emerging mobile pedagogies, and the technological advancements that underpin many innovations. Critical and cautionary perspectives are less common, but they are likely to surface as the field continues to mature. Ball [4] argues that in inclusive pedagogy, the use of technology "has the potential to provide and liberate, but there exists also a responsibility on educators to ensure it does not prevent and restrict" (p.1). In a similar vein, Seale [19] warns that technology can be "a double-edged sword" (p.3). When we consider mobile devices specifically, their use in education can cause some problems as well as solving others [12]. On the technological front, mobile learning is becoming more sophisticated with the advent of context-aware services, mobile social networks, augmented reality, haptic interaction and a raft of other advancements that are a constant surprise to ordinary users. These unanticipated innovations undermine the fragile stability of mobile learning, as it struggles to assert itself within traditional education and in relation to more established online learning and e-learning. It is also the case, however, that mobile technologies and associated learning and teaching strategies have matured to the extent that there is now greater

clarity around good design practices where accessibility is among the guiding principles[21].

A key aim of this paper is to examine the concept of inclusive mobile learning, bearing in mind the new generation of mobile learning tools and strategies that are now available to increasing numbers of learners. A more profound understanding of inclusive mobile learning may also be derived from a review of mobile learning projects that have placed inclusivity at the heart of their concerns, thus furthering the inclusion agenda and bringing hope to learners with particular requirements. In order to ascertain future prospects for inclusive mobile learning, the paper finally offers a critical perspective on emerging forms of mobile interaction, including speech-based and audio-based forms of interaction, which are becoming increasingly common.

WHAT IS INCLUSIVE MOBILE LEARNING?

Inclusive education "involves focusing on the individual needs of learners, helping them to overcome any barriers that may prevent them from reaching their potential" [25]. In this broad definition, any learner might require some form of assistance to enable them to reach their potential; it is then a question of identifying the barriers that they need to overcome. Attewell [2] gives the example of a learner whose greatest barrier to reading was "his self-evaluation of his reading ability" (p.13); this learner perceived reading to be a book-based activity, in which he had not been successful, but it turned out that he had no difficulty reading other texts and information about his mobile device. In other cases, barriers consist of physical impairments and individual learner differences that in some way set them apart from other learners, in terms of how they learn or how they can use a mobile device.

Pollak's [19] work on neurodiversity, or specific learning differences, includes descriptions of a number of helpful mobile software tools and device features such as voice recognition, screen reading, voice recording, digital pens for electronic notetaking, and optical character recognition to read aloud any text that has been photographed. Learners with dyslexia, Asperger syndrome, and so on, might have tools that support their specific needs, of which their teachers might not even be aware. This puts the onus on learners to look for assistance with their specific needs; alternatively, teachers could recommend various tools to the whole class on the basis that these may be useful to large numbers of students. The great diversity of mobile phones and other devices makes such advice-giving difficult. In a discussion of inclusive approaches to mobile learning, Traxler [23] argues in favour of the use of student-owned devices for learning, while acknowledging that institutions would find this very challenging.

Walker [25] goes on to remark that inclusive education for young people aged 4-19 is concerned with social equality, supporting those with special educational needs, those who are disengaged and those who are 'hard to reach'. Individual learner needs should therefore also be considered in the social context of identified (and perhaps as yet unidentified) target groups and the objective of offering equal opportunities to all, whatever their age, gender, ethnicity, background or attainment. A related point is made by Pollak [19] in relation to Higher Education; he remarks that the onus of responsibility could shift from individual students to educational institutions and the staff they employ. For example, if dyslexia is regarded as a learning *difference* rather than a *difficulty*, then it becomes the responsibility of institutions and tutors to meet the needs of this target group of students (*op cit*., p.17). Besides, any difference between learners could be seen as a resource to support learning, rather than as a problem to be overcome [25]. Thus the original concept of a 'barrier' becomes a

kind of mechanism for enabling a different way of perceiving the needs and potential contributions of individual learners and groups of learners sharing certain characteristics.

Open and distance education, and e-learning, which are becoming increasingly popular on a global scale, present particular challenges when it comes to accessible, inclusive mobile learning. It is true that there is a long tradition of opportunity offered to learners with both declared and undeclared disabilities. At The Open University, UK, there are over 12,000 students with a disability, health condition, mental health disability, or specific learning difficulty The Open University [22]. Ensuring individuals' needs are met is not always easy, but a wealth of experience in this specialist area makes it easier than is the case in many other organizations. In the UK, distance education has in fact evolved from an individual-focused educational provision towards group-based learning, however Keegan [11] reminds us that in distance education there are "crucial didactic and logistical differences between teaching adults in groups or as individuals" (p.12), and the same can be said of adapting tools and materials to individuals' and target groups' needs. Meeting the needs of students with disabilities and specific learning difficulties within larger groups has always been a significant challenge, especially because learners are remote from their tutors and from other learners who could potentially assist them.

Another inclusion imperative is the desire to widen participation in schooling and in further and higher education. Inclusivity is thus an umbrella term that brings together concerns with issues of disability, diversity and widening participation. It is well established that current digital technologies support inclusivity by enabling and facilitating many forms of communication and collaboration, as well as access to a greater variety of learning resources, with the potential to broaden the appeal of education to under-represented groups. These communication facilities

and resources are increasingly available on mobile phones and other portable devices; thus mobile learning promises more equitable access to education, especially for those who have suffered exclusion. Mobile technologies have been shown to support learning in disaffected and hard-to-reach students for whom attending school was problematic [5]. Mobile learning thus reaches out to those who might otherwise be marginalized, although there is perhaps a residual risk that such individuals and groups will remain separate and distanced, if technology were to become the sole means of addressing their issues.

MOBILE LEARNING PROJECTS AND INCLUSION

There have been a number of mobile learning projects furthering aspects of inclusion. The early 'm-learning' research and development project [2, 20] established, *inter alia*, that mobile learning improved disaffected young adults' literacy and numeracy skills; it helped them identify areas where they needed support; mobile learning also helped tutors and learners become aware of existing abilities that had not been previously recognized. Therefore alongside intended learning outcomes such as skills acquisition that could lead to improved confidence and the ability to progress to higher levels of education, mobile learning contributed to planning longer-term development and it highlighted that some learner abilities may be revealed and acknowledged through the use of new educational media that are part of learners' everyday lives. This project embodied a range of efforts to keep learners engaged with education.

Another reason why learners may become discouraged and excluded is when they are suffering from mental health issues; these are an important social and educational concern, since suffering from a mental health illness can lead to stigmatization and discrimination as well as learners dropping out of education. The 'Mobile Mood Diary' project [16, 1] developed

support for young people aged 9-18 with mental health issues, specifically enabling self-monitoring of a young person's mood as part of their cognitive behavioural therapy. A mobile phone version of a paper diary helped learners recognize the factors which may be impacting on their mood and how they have managed at times when they have felt depressed and could be at risk of withdrawing from education.

There has also been some research with marginalised young people who are neither in employment nor education; they have limited access to computers, but they do have mobile phones. The ComeIn project [24] targeted marginalised young people aged 14-21. The project sought to take advantage of their access to mobile phones by reaching out to them via an approach based on mobile access to a community platform with video streaming; on this online mobile community platform, the young people could create positive learning experiences as well as having interactions with other young people and youth workers.

Connecting people across distance while enabling some of them to be mobile turns out to be an important theme running through many projects on inclusion. Walker [25] reports some case studies, for example the use of mobile technology to improve communication at a school for deaf children and use of mobile phones to support students who are frequently away from college on work experience placements in widely dispersed locations. In higher education, 'Enabling Remote Activity' (ERA) researchers [8] worked on connecting geology field sites with distanced learners who could not participate in field trips: students with disabilities who were unable to take part in fieldwork could have remote access, and could complete aspects of the fieldwork through an in-situ guide. Inspired by this development, other researchers created the 'Out There In Here' (OTIH) project [6, 7] which explored the possibilities for mobile and tabletop technologies to support distributed, synchronous collaborations between students in the field and others based in a stationary location.

The focus was on how field and indoor based students could be connected so that their contrasting circumstances and capabilities could be used positively as a basis for learning, playing to the strengths of each group.

The MASELTOV project [15] represents the next generation of projects in social inclusion. It aims to facilitate and foster local community building, drawing immigrant populations into a closer relationship with other people in the host country. The project will develop integrated mobile navigation, information, learning, gaming and social network services on smartphones, enabling users to move more easily around an unfamiliar city, make contact with people who will help them, improve their language skills and their understanding of local culture. The project is targeting migrant populations with low literacy levels who have access to mobile phones but are at risk of remaining isolated and on the margins of society. Their digital literacy levels are likely to be variable, and issues of accessibility will need to be considered.

A CRITICAL PERSPECTIVE ON MOBILE LEARNING AND INCLUSION

It is recognized that mobile technologies can play a role both in supporting existing learners and in attracting underserved populations of potential learners; for example, learning materials can become accessible to a larger audience through podcasts, mobile applications, blogs and e-books, some of which will be accessed freely by potential students [13]. Furthermore, mobile learning empowers underprivileged groups, including women and children in rural areas across the world, who traditionally have suffered from poor access to education. Developing their literacy and numeracy skills leads to reduced dependence on others. Women and children can take part in mobile learning programmes which enable them to receive text messages on the phone at home to practise their reading and writing. Their general education can also be improved through easier access to

audio resources and voice recording, so that they do not have to rely on reading and writing.

However, contemporary electronic learning materials often rely on certain literacies, skills, abilities and personal attributes that should not be taken for granted. In an effort to help visually impaired students with their English language learning, the ELLVIS project [10] worked on the potential of tactile and haptic interfaces, exploring their advantages over the auditory-based interfaces which are more common. It used a combination of force feedback devices and 3D-sound navigation as an alternative user interface, eliminating the need for a screen reader. In this way, blind and visually impaired learners were able to gain access to some types of oral language practice that other learners would be able to use routinely and without problems. This creative attitude to designing new interfaces will hopefully be extended to the development of other technologies, both mobile and static. On the other hand, use of the force feedback device and 3D-sound navigation would be a new skill-set to be mastered before the language materials could be easily studied.

Social inclusion and digital inclusion are interrelated, and the promotion of digital inclusion can have a positive impact on social inclusion. Seale [19] affirms that digital inclusion cannot be judged merely on the basis of *access* to relevant technologies; access is just one facet of a multi-faceted concept that also includes technology use, participation and empowerment. Seale concludes that digital inclusion is "as much a social, cultural and cognitive concept" as it is a technological one (p.8). In relation to issues of accessibility, Douce *et al.*[9] have remarked that the notion of an accessible learning environment is not limited to the digital realm: "True accessible learning environments take account of the physical surroundings, the immediate working environment as well as the tools that learners have at their disposal". There is more work to be done on

understanding the relationships between these various aspects in the context of mobile technology use to promote inclusion.

Speech-based interaction with mobile phones entered the mainstream in 2011 through the introduction of the Siri voice assistant on the iPhone. Although this facility does not always work as smoothly as intended, it heralds a new era of voice-based interaction being available as a standard feature. Rapid technology developments signal other innovations; for example, LookTel [14] has developed a new mobile app to help people with vision problems to identify common objects. The app enables a person to take a picture of an object with an iPhone, add an audio message, and save it to a database. When someone who is visually impaired uses the app, they can point the iPhone at an object and if it is in the database, it should be recognized and the user will hear the associated audio message. This app was not developed with education in mind, but a similar approach would work in a number of educational settings.

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